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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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RICHFELD, OH 44286				
EXAMINER				
HAILEY, PATRICIA L				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/564,019

Applicant(s)

UKRAINTSEV ET AL.

Examiner

PATRICIA L. HAILEY

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Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Applicants' Priority Document was filed on January 9, 2006.

Specification

2. ***The disclosure is objected to because of the following informalities:***

On page 4 of the Specification, in line 2, "fluorine C₇₀" should be "fullerene C₇₀".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. ***Claims 1, 3, and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 95/10481 (hereinafter "the WO document") in view of Hirai et al. (U. S. Patent No. 4,621,150).***

The WO document teaches a method for producing a composition comprising a carbon nanotube (considered to read upon the limitations "nano-carbon material", "carbon nanotubes", and "cathodic deposit" in **claims 1, 3, and 4**) and/or a nested fullerene having transition metal particles, clusters, and/or coatings; exemplary transition metals include Pd (palladium). See the Abstract of the WO document.

The method involves reacting at least one of the carbon nanotube and the nested fullerene with at least one metal complex of the formula L_nM , wherein L is a metal ligand, and M is the transition metal, followed by isolating and washing the reaction product, and heating to drive off any residual ligand (considered to read upon the limitation "reducing", thereby producing the carbon nanotube and/or nested fullerene

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with metal particles, clusters of particles, and/or coatings attached (considered to read upon the limitation "precipitated"). See page 3, lines 6-24 of the WO document, as well as page 7, line 26 to page 8, line 4.

Exemplary metal ligands include cyclopentadienyl, cyclooctadiene, and triethylphosphine. See page 7, lines 19-25 of the WO document.

The composition produce by the method of the WO document is useful as catalysts in chemical reactions such as hydrogenation and isomerization. See page 9, lines 4-15 of the WO document.

The WO document does not teach or suggest the employment of tetra aqua-palladium (II) perchlorate, as recited in claim 1.

Hirai et al. disclose a catalyst for isomerization consisting essentially of a salt or complex salt of the formula $[ML_m]^{n+}[Y]_n^-$, wherein M is a metal of Groups IB, IIA, IIB, or VIII, L is a ligand, Y is a conjugated base of a Brønsted acid, the variable "m" can be 0, 1, 2, 3, or 4, and the variable "n" is 1, 2, or 3. See the Abstract of Hirai et al., as well as col. 3, lines 8-15.

Examples of the metal include palladium; exemplary ligands include cyclopentadienyl, 1,5-cyclooctadiene, and triethylphosphine. Additionally, examples of the conjugated base of the Brønsted acid include a perchlorate. See col. 4, lines 6-25 of Hirai et al.

In the aforementioned formula, when M is palladium, "m" is 0, "n" is 2, and Y is a perchlorate, palladium perchlorate is obtained, which is considered to read upon Applicants' "tetra aqua-palladium (II) perchlorate".

The salt or complex salt of Hirai et al. is considered functionally equivalent to the metal complexes disclosed in the WO document, as they are formulaically similar.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method disclosed in the WO document by substituting the metal complex disclosed therein with the palladium (II) perchlorate-metal salt complex disclosed in Hirai et al., as Hirai et al. disclose functional equivalence between said complexes, in making catalysts comprising palladium.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 95/10481 (hereinafter "the WO document") in view of Hirai et al. (U. S. Patent No. 4,621,150) as applied to claims 1, 3, and 4 above, and further in view of Vasilevskis (U. S. Patent No. 5,376,353).

Both the WO document and Hirai et al. are relied upon for their teachings with respect to claims 1, 3, and 4. While the WO document discloses nested fullerenes, the reference does not disclose "fullerene C₆₀", as recited in claim 2.

Vasilevskis disclose a metal-containing hydrogenation catalyst comprising fullerene (e.g., C₆₀, see col. 2, lines 35-36), having platinum group metals such as Pd (col. 3, lines 40-42). The Pd can be adsorbed onto the surface of the fullerene via complexing the fullerene molecule (e.g., C₆₀[(ML_n)_m], wherein L is a ligand such as a phosphine, see col. 5, lines 1-6 of Vasilevskis). See col. 4, lines 55-68 of Vasilevskis.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of the WO document and Hirai et al. by

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employing fullerene C₆₀ as suggested by Vasilevskis, motivated by the references' teachings regarding palladium-containing hydrogenation catalysts, and the respective metal complexes disclosed therein to produce said catalysts.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 95/10481 (hereinafter "the WO document") in view of Hirai et al. (U. S. Patent No. 4,621,150) as applied to claim 1 above, and further in view of Howard et al. (U. S. Patent No. 5,273,729).

The WO document and Hirai et al. are relied upon for their teachings with respect to claim 1. While the WO document discloses fullerenes, the reference does not teach the mixture of C₆₀ and C₇₀ in mass percentage ranges as recited in claim 5.

Howard et al. disclose the production of fullerenes in yield and composition of C₆₀ and C₇₀ (C₆₀ + C₇₀) in mass percentages reading upon that instantly claimed. See Table 3 of Howard et al., Sample Numbers 4b and 6a, which exhibit mass percentages of 60.625% C₆₀/39.375% C₇₀ and 76.43% C₆₀/23.57% C₇₀, respectively.

For Applicants' convenience, an excerpt of Table 3 of Howard et al. (and the calculated mass percentages of C₆₀ and C₇₀) is included herewith.

Sample No.	C-60	C-70	Sum (C ₆₀ +C ₇₀)	% C-60	% C-70
1a	2394.4	3498.64	5893.04	40.63098	59.36902
1b	1286.97	3050.34	4337.31	29.67208	70.32792
1c	753.54	2198.38	2951.92	25.52711	74.47289
2a	116.84	321.26	438.1	26.66971	73.33029
2b	78.72	287.52	366.24	21.4941	78.5059
3a	14819.64	14848.24	29667.88	49.9518	50.0482
3b	99591.78	174749.5	274341.2	36.30215	63.69785
4a	40.6	268.87	309.47	13.1192	86.8808

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4b	95.06	61.74	156.8	60.625	39.3
5a	504.72	697.81	1202.53	41.97151	58.028
5b	45.59	43.96	89.55	50.91011	49.089
6a	119.84	36.96	156.8	76.42857	23.571
6b	127.31	402.52	529.83	24.02846	75.971
7a	152.38	262.92	415.3	36.69155	63.308
7b	795.18	2618.58	3413.76	23.29338	76.706

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of the WO document and Hirai et al. by incorporating therein the (C₆₀ + C₇₀) fullerenes, as suggested by Howard et al., since these fullerenes have been shown to have potential applications as catalysts in industrial processes, as suggested by Howard et al. at col. 1, lines 24-26.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PATRICIA L. HAILEY whose telephone number is (571)272-1369. The examiner can normally be reached on Mondays-Fridays, from 7:00 a.m. to 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 1700 Receptionist, whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/PATRICIA L. HAILEY/
Examiner, Art Unit 1793
March 21, 2008